DOCUMENT RESUME

ED 429 912 SO 030 662

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TITLE Effect of Computer Assisted Instruction on Students' Achievement in Global Studies.
PUB DATE 1998-10-00
NOTE 14p.; Paper presented at the Annual Meeting of the Northeastern Educational Research Association, (Ellenville, NY, October 28-30, 1998).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; Comparative Analysis; *Computer Assisted Instruction; *Global Education; Grade 10; High Schools; Pretests Posttests; Research Design; Social Studies; Urban Schools
IDENTIFIERS New York City Board of Education; T Test

ABSTRACT

A pretest posttest experimental group design was used to study the effects that computer assisted instruction (CAI) has on urban school, tenth grade students' achievement in global studies. Students were selected and assigned to one of two groups using random selection and assignment techniques. A pretest confirmed the equivalence of the two groups. After a six-week treatment of the experimental group, a posttest administered to both groups assessed the effect of the treatment. Items from the June 1993, 1994, and 1995 global studies unit of the New York State Regents Examination were used to develop an assessment instrument. The assessment found that students using CAI achieved significantly higher scores on a posttest than students taught by traditional methods. An attitude survey showed an increase in motivation and interest for students who were taught with CAI. Results may be generalized to classrooms in urban settings where students consist primarily of minority populations. Contains 3 tables of data and 13 references. (BT)

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ED 429 912

Effect of Computer Assisted Instruction on Students' Achievement in Global Studies

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October 1998

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SO 030 662

Abstract

A pretest posttest experimental group design was implemented to study the effect of CAI on achievement in social studies of tenth grade students in an urban school. A pretest administered to students who were randomly selected and assigned to experimental and comparison groups (n=70) demonstrated that the groups were equivalent. After six weeks, a *t*-test found that students using CAI achieved significantly higher scores on a posttest than students taught by traditional methods.

Paper presented at the 1998 annual meeting of the Northeastern Educational Research Association in Ellenville, New York.

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Effect of Computer Assisted Instruction on Students' Achievement in Global Studies

Introduction

The National Council for Social Studies defines social studies education as a basic component of the K-12 curriculum. Deriving its goals from the nature of citizenship in a democratic society closely linked to other nations and peoples of the world, social studies curriculum draws content primarily from history, the social sciences, and the sciences.

General goals of the social studies curriculum can be grouped into three categories: knowledge, values and beliefs, and skills (Vockell, 1992). Knowledge of specific content in social studies provides the basis for an understanding of human affairs and conditions thereby assisting students in developing their personal values and beliefs, and their skills. Values help to set standards for individual and group behavior; beliefs represent a commitment to those values. Skills important to the social studies curriculum are related to acquiring, organizing, and using information, and to interpersonal relationships and social participation. Such skills enable students to link knowledge with beliefs that lead to action.

The global studies curriculum is a component of the high school social studies curriculum typically spanning the four semesters of grades 9 and 10. In global studies, students learn to compare regions and cultures and to analyze historical events and movements. Students are taught, for example, to compare the traditional societies of China and Africa, of India and Japan, and the South American people and cultures; and also to consider the causes of World Wars I and II, the development of Japan, and the

rise of totalitarian governments. The curriculum introduces students to the history of the post-World War II period covering such events as the Warsaw Pact, The North Atlantic Treaty Organization, the division of Germany and Berlin, and the Korean War. Students learn about global issues such as acid rain, overpopulation, environmental pollution, human rights, technology, industrialization, illiteracy, terrorism, and growing world interdependence.

Review of Related Literature

Efforts to improve the quality of instruction in social studies have attempted to improve teaching by moving classrooms away from conventional didactic instructional approaches (in which teachers do most of the talking and students listen and complete short exercises on subject area-specific material) towards active instructional approaches (in which students are challenged with complex, authentic tasks). Educational reformers have advocated use of multidisciplinary projects, cooperative learning groups, flexible scheduling, and authentic assessment (Means and Olson, 1995). In a complex educational setting, computers become valuable tools because they provide support for students and teachers in obtaining, organizing, and displaying information.

Effective classroom learning activities use direct and purposeful experience. Learning occurs when learners are involved in goal setting and when they see the learning process as meaningful (Barr, 1994). Applying this theory to instruction in social studies, it would appear that effective learning requires students to be active learners (rather than passive) and should involve learners, whenever possible, with direct experience of the culture about which they are learning.

Teachers using traditional methods face a diversity of students' academic levels in any given class (Roedding, 1990). Slower learners may get lost in the rush to "cover" the curriculum and maintain interest of higher-performing students. Roeddings' implemented a computer drill and practice program for students who consistently scored low on tests in government, world history, and United States history. The students used the program during two units or three times a week for about thirty minutes in an effort to increase their performance skills. The study found that students scored significantly higher after two months of computer use.

In a study that related students' cognitive style to instructional effectiveness, Riding and Sadler-Smith (1992) found that graphic and pictorial information improved fact retention of high school students with diverse cognitive styles. Computer assisted instruction met the needs of 129 students with "different" learning styles whose needs would may have been unmet in a traditional classroom.

Interactive technology, a combination of text, audio, and visual data within an information delivery system, represents a powerful tool for teachers and students. One strength of interactive technology is that it can be modified to fit any objective or display order. The mix of video chips, stills, maps, and high quality graphics provides a variety of materials designed to capture students' interest.

Through a combination of text, sound, and visual data, the microcomputer has shown promise of aiding social studies teachers in motivating students and translating abstract ideas into concrete examples (Martorella, 1991). Instructional software can assist teachers by prescribing individual learning path for students (Martorella, Barton, and Steelman (1994). Integrated systems offer thousands of lessons covering the same

basic skills now taught in lockstep through text books to groups of students with different backgrounds, interests, and motivation. With an integrated learning system, students can develop at an appropriate pace in a non-threatening environment. Educational technologies can, by design, provoke students to raise searching questions, enter debates, formulate opinions, engage in critical thinking, and test their views of reality. On-line tools and resources allow students to efficiently gather and evaluate information, and to communicate their thoughts and findings.

Teachers used laser disc software to enhance social studies, science, literature, and arts instruction for ABE/GED classes at the Adult Education and Job Training Center in Lewiston, Pennsylvania (1993). An experimental pretest-posttest comparison group study found that the adult students who used computers scored significantly higher in social studies than those taught exclusively through traditional methods.

Avery (1994) described a cooperative learning program jointly developed by computer educators and world history teachers in secondary school, and students who created "mock" newspapers. Avery asserted that the project encouraged critical thinking skills and cross-disciplinary objectives, and resulted in higher student grades.

Based upon the results of a study comparing traditional methods of teaching with the use of CAI, Clarke (1992) concluded that students who used CAI performed higher in social studies than those who used traditional methods.

Foyce and Yates (1993) demonstrated that students who developed their own databases in problem solving activities seemed to acquire significant social studies and history skills.

Coriello (1993) described an interdisciplinary program that used primary sources and computer databases to enhance students' interest in learning about immigration in United States history. He concluded that use of computers enhanced students' achievement in social studies.

Klenow (1992) demonstrated methods implemented by three teachers who used computers to reinforce various student skills. Demonstrating that reinforcement led to higher student grades, Klenow discussed the ways in which technology assisted teachers in developing and strengthening student skills as they learned about social studies.

Evidence suggests that computers offer an instructional tool that helps motivate students to acquire knowledge and develop thinking skills. This present study tested the hypothesis in an urban setting with a sample of students representing "minority" populations.

Statement of the Problem and Hypothesis

This study investigated the effect of Computer Assisted Instruction (CAI) on students' achievement in global studies. The researchers hypothesized that Computer Assisted Instruction would effect students' achievement in global studies.

Method

Participants

The sample (n=70) was selected at random from a total population of 276 tenth grade students at a public high school in Brooklyn, New York. The population at the high school was 55% African American, 40% West Indian, and 5% Hispanic.

Design

A pretest-posttest experimental group design was used for this study. Students were selected and assigned to one of two groups using random selection and assignment techniques. A pretest confirmed the equivalence of the groups. After a six-week treatment of the experimental group, a posttest administered to both groups assessed the effect of the treatment.

Instrumentation

Items from the June 1993, 1994, and 1995 global studies unit of the New York State Regents Examination were used to develop an assessment instrument. The New York State Regents Examinations are achievement tests that high school students in New York State must pass to obtain a Regents High School Diploma. The examinations are considered a valid and reliable measure of student performance (r = 90 approx.). The global studies component of the examination consists of 48 multiple choice items and three essay questions (from a choice of seven).

Setting

The CAI classroom (experimental group) met in the traditional classroom three times weekly and, additionally, twice weekly in a room with 36 IBM 486 computers with 40 Mb Hard drive, 10mb RAM, thirty six monitors and CD ROM drive, two Macintosh computers system 7 with 8 megabits of memory, a Videodisk Player, and a television.

Procedure

Before the start of the 1996/97 school year, 70 of the 276 tenth grade students were selected and assigned at random to two classes of 35 each. One of the classes was designated as the experimental group by random assignment.

The study was implemented over six weeks. The comparison group received traditional classroom instruction five days a week for forty minutes a day. Traditional instruction included lectures and class discussions. Students worked individually and sometimes in pairs locating places on the map. Students used textbooks and copied notes from the board. Students also used the library as a source of information. The teacher lectured and used the chalkboard as students listened and took notes.

The experimental group received traditional instruction for three days of 40 minutes each day in the classroom. Instead of receiving traditional instruction for the remaining two days, the experimental group used CAI instruction for 40 minutes each day in the computer lab. CAI instruction involved use of a videodisk player that has a computer interface, a television and a system 7 Macintosh computer. The software, titled *Communism and the Cold War*, was a visual database stored on a twelve inch two-sided videodisk and four 3 ½" Macintosh disks. The information contained on the videodisk was configured and sequenced by the instructor before this study was put in place and presented as part of the overall unit plan. Additional support included teacher-led lessons and teacher-directed activities, a timeline, a cross curriculum index, barcode commands, and operational guide. The information contained on the videodisk was configured and sequenced by the instructor before this study was put in place and presented as part of the overall unit plan. The teacher organized the CAI lessons and activities to supplement the tradition textbook. The students worked individually and in pairs.

The teacher's role differered in the two groups. In the comparison group, the teacher served more as disseminator of information, whereas teacher served more as a facilitator for the experimental group.

Both the experimental and comparison groups studied identical subject matter. The unit, Communism and the Cold War, covered the origin of the Cold War in the post-1945 era ending with the breakdown of communism and rise of Russian nationalism in the late 1980s and early 1990s. In week 1, students explored the effect of communism on the Soviet society and communism's economic and political advantages and disadvantages. In week 2, students learned about the goals of Soviet foreign policy following World War II and the Soviet domination of Eastern Europe. In week 3, the focus was on the goals of Soviet foreign policy following World War II and on issues that divided the Soviet Union and the west. In week 4, the Cold War and Cold War politics were covered. In week 5, students considered factors leading to Russian nationalism in the 1980s and 1990s and Gorbachev's efforts to reform the Soviet system. In week 6, students focused on the collapse of the Soviet Union and the collapse of communism in Western Europe.

The comparison group met in the morning during the third period; the experimental group met in the afternoon during the seventh period. The same teacher taught both groups using identical texbooks (*A Global Mosaic* [Peageng-Gerald & Leinward] and *Pageant of World History* [Ifikhar, A]). The two groups spent the outset of each lesson on identical "Do now" exercises, completed identical homework assignments which were reviewed in class each subsequent day.

Results

Equivalence of the experimental and comparison groups in prior achievement in global studies was confirmed through *t*-test analysis to compare the pretest mean scores of the experimental and comparison groups at .05. Table 1 below presents the pretest results.

Table 1

Pretest results

Group	Mean	sd	t
Experimental	51.03	6.04	-1.38
Comparison	53.20	7.08	

df =68

A posttest administered to the experimental and comparison groups after treatment found a significant difference between test scores of the groups at .05 (t=4.09, 68 df), supporting the hypothesis that computer assisted instruction would effect students' achievement in social studies. Table 2 below presents posttest results.

Table 2

Posttest results

Group	Mean	sd	t
Experimental	72.03	8.80	4.09*
Comparison	64.40	6.63	

df = 68

An attitude survey was administered to the two groups at the completion of the project to assess their motivation and interest in learning about communism and the cold war. Analysis of attitude scores indicated that motivation and attitude of students in the experimental group were significantly higher at .05 than motivation and attitude of students in the comparison group (t = 12.63, 68 df). See table 3 below.

Table 3

Attitude survey results

Group	Mean	sd	t
Experimental	34.29	5.02	12.63*
Comparison	19.43	4.81	

df=68

Discussion

Results of this study supported the hypothesis that computer assisted instruction would effect students' achievement in global studies. Test scores of students using CAI were significantly higher than students taught by traditional methods only. Both groups had similar scores in global studies prior to the study; upon completion students in the

experimental group (who used CAI) achieved higher test scores than students in the comparison group.

An attitude survey showed an increase in motivation, and interest among students who were taught with CAI. The results of this study may be generalized to classrooms in urban settings where students consist primarily of minority populations. The study was implemented over six weeks and covered a small section of a global studies curriculum that actually spans four semesters or two grade levels. A more extensive study would use CAI to supplement instruction over a greater portion of the curriculum and, moreover, would be implemented over a longer time. A study focusing on other student populations and implemented in a different setting (for example, in the suburbs) may or may not produce similar results.

The result of this study is consistent with the findings of Klenow (1992) and other researchers that CAI helps to reinforce skills that led to higher achievement in social studies. The result is also consistent with the conclusions of Riding and Sadler-Smith (1992) that graphic and pictorial information improves fact retention, and that fact retention leads to improved performance in social studies particularly for students with diverse cognitive styles.

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